

C9

37. (Amended) The method of claim 36, wherein the arranging step comprises configuring the first and at least second parallelogram linkages non-parallel to each other.

REMARKS

Reconsideration of this application, as amended, is respectfully requested.

Initially, Applicants would like to thank the Examiner for the indication that claims 9-11, 33, 34, 46, 47, and 49 contain allowable subject matter.

In the Official Action, the Examiner rejects claim 23 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, the Examiner argues that the term "an amount of surface area in contact with the payload" is indefinite as to which element has the surface area in contact with the payload. In response, claim 23 has been amended to clarify that the ramp means engages the deformable mat to vary an amount of surface area of the deformable mat in operative contact with the payload as is discussed in the specification at pages 45-46. Accordingly, it is respectfully requested that the rejection of claim 23 under 35 U.S.C. § 112, second paragraph, be withdrawn.

In the Official Action, the Examiner rejects claims 1-4, 7, 12, 13, 19, 27-29, 35, 36, and 38 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,732,802 to Tsukagoshi (hereinafter "Tsukagoshi"). Additionally, the Examiner rejects claims 1-5, 8, 12, 13, 27-32, and 35-38 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,068,825 to Macpherson (hereinafter "Macpherson"). Furthermore, the Examiner rejects claims 1 and 17 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,389,900 to Leist et al. (hereinafter "Leist"). Still further, the Examiner rejects claim 6 under 35 U.S.C. § 103(a) as being unpatentable over Tsukagoshi in view of U.S. Patent No. 5,052,529 to

Sutcliffe et al. (hereinafter "Sutcliffe"). Still further, the Examiner rejects claims 14-16 under 35 U.S.C. § 103(a) as being unpatentable over Leist in view of U.S. Patent No. 3,191,896 to Nathan (hereinafter "Nathan"). Still further, the Examiner rejects claims 18, 39, and 41 under 35 U.S.C. § 103(a) as being unpatentable over Leist in view of U.S. Patent No. 3,834,257 to Ganser (hereinafter "Ganser"). Still further, the Examiner rejects claims 20-23 under 35 U.S.C. § 103(a) as being unpatentable over Tsukagoshi in view of U.S. Patent No. 5,127,622 to Whelpley et al. (hereinafter "Whelpley"). Still further, the Examiner rejects claim 24 under 35 U.S.C. § 103(a) as being unpatentable over Tsukagoshi and Whelpley and further in view of U.S. Patent No. 4,887,699 to Ivers et al. (hereinafter "Ivers"). Still further, the Examiner rejects claim 25 under 35 U.S.C. § 103(a) as being unpatentable over Tsukagoshi in view of Prior Art Figure 19. Lastly, the Examiner rejects claim 26 under 35 U.S.C. § 103(a) as being unpatentable over Leist in view of U.S. Patent No. 6,022,005 to Gran et al. (hereinafter "Gran").

With regard to independent claims 1, 27, and 36, the same have been amended to recite that the motion constraint means comprises first and at least second parallelogram linkages, each having first and second parallelogram sub-linkages, where one of the first or second parallelogram sub-linkages is fixed to the payload or a portion thereof, and the other of the first or second parallelogram sub-linkages is fixed to the base structure or a portion thereof. With regard to independent claim 39, Applicants respectfully traverse the Examiner's rejection under 35 U.S.C. § 103(a) for at least the reasons set forth below.

Turning now to the prior art, Tsukagoshi shows a motion constraining mechanism where the payload is kept parallel to the base. However, such is done at the expense of forcing the payload to shift laterally. That is, as the payload moves up or down

relative to the base, the motion constraining mechanism forces the payload to move laterally a predetermined amount that is dictated by the geometry and instantaneous position of the linkages. That is, the motion constraining mechanism does not allow independent vertical and lateral motions of the payload relative to the base, since single parallelograms are used to connect the payload to the base. That is, the motion constraining of Tsukagoshi has only one degree-of-freedom. More importantly, one cannot put two of these single parallelograms together in a non-coplanar manner to obtain an isolation platform, which would allow axial motion and lateral motions in two perpendicular planes, i.e., to allow full spatial translation (e.g., in X, Y and Z directions of a Cartesian coordinate system). In fact by doing so, the one degree-of-freedom of the payload is reduced to zero and the mechanism becomes a structure.

Furthermore and fundamentally, the motion constraining mechanism of this invention CANNOT be used to isolate payload from vibration since it cannot provide for independent vertical and lateral (in two independent directions) motions. The mechanism of Tsukagoshi also cannot be used to isolate a payload from a base because link 22 (as shown in Figure 12) will always transmit a component of the load from the payload to the base. In the case where the link 22 is vertical, the entire load of the payload will be transmitted to the base.

In any event, Tsukagoshi does not teach or suggest the use of two or more parallelograms between a base and payload, where each of the parallelograms comprises two sub-parallelograms to isolate a payload from a base structure, as is now recited in independent claims, 1, 27, and 36.

Rusen teaches a flexure mechanism and not a linkage mechanism (which are constructed with relatively rigid links) as is the subject of the invention recited in independent

claims 1, 27, and 36. The above two types of mechanisms belong to different classes of mechanisms (one called rigid link mechanisms or simply linkage mechanisms and the other called a Flexural mechanism). Flexural mechanisms are intended to allow very small motions whereas linkage mechanisms are intended to provide for gross motions. As described in Rusen, the flexural (beam) elements are used to work in bending and to be very rigid in the axial direction (Figures 3-16, 18-24). As a result, the assemblies such as those shown in Figures 5, 6, 8, 9, 12, 13, 16 and 18 can allow only for a small axial motion (axial being in the direction of subjecting the flexures to bending) while being very rigid in the lateral directions (i.e., in the direction of stretching these beam elements). If such flexural mechanisms are used for isolating a tall payload (such as those routinely encountered in launch vehicles), the payload could tilt and hit the faring due to lateral motions since such flexural mechanisms still allow certain amount of "non-parallel-ness" while one of the flexural beams bends upwards and the other one bend downwards, recalling that a slight angular rotation at the base of a tall payload would translate into a large lateral displacement at the top of the payload. In general, one could put together flexural elements in a number of ways, some of which are indicated in Rusen. However, due to the basic nature of such flexural mechanisms, one cannot design a motion constraining mechanism with flexural mechanisms that allow for relatively large motions that are required for isolation systems that are subjected to large amplitude vibration.

In any event, Rusen also does not teach or suggest the use of two or more parallelograms between a base and payload, where each of the parallelograms comprises two sub-parallelograms to isolate a payload from a base structure, as is now recited in independent claims, 1, 27, and 36.

As discussed previously, component 11 of Macpherson is not a support means and does not provide a vertical or lateral support to suppress transmission or a vertical or lateral vibrations. Macpherson merely shows a jack that has no degrees of freedom. If the jack of Macpherson is pushed laterally or vertically, it will not move.

In any event, Macpherson also does not teach or suggest the use of two or more parallelograms between a base and payload, where each of the parallelograms comprises two sub-parallelograms to isolate a payload from a base structure, as is now recited in independent claims, 1, 27, and 36.

With regard to Leist, Applicants respectfully submit that the same also does not teach or suggest the use of two or more parallelograms between a base and payload, where each of the parallelograms comprises two sub-parallelograms to isolate a payload from a base structure, as is now recited in independent claims, 1, 27, and 36.

The Examiner also rejects independent claim 39 as unpatentable under the combination of Leist and Ganser. The Examiner argues that Ganser discloses an elastomer extruded tubular element coiled in a helical manner as is recited in claim 39 and that it would have been obvious to combine such with Leist. Applicants respectfully disagree with the Examiner's analysis regarding the combination of Leist and Ganser.

The device of Ganser is a radially expandable mandrel for holding a tubular element disposed over the mandrel when the mandrel is expanded. Ganser does not teach or suggest the use of the mandrel to either isolate or support a payload relative to a base. Therefore, there is absolutely no motivation or suggestion to use the mandrel of Ganser with the device of Leist. Applicants respectfully submit that absent such motivation or suggestion,

the combination of Leist and Ganser under 35 U.S.C. § 103(a) against claim 39 is improper and must be withdrawn.

Applicants further submit that Ganser is from a non-analogous art since it is neither directed to the same field of the invention nor reasonably pertinent to the particular problem with which the inventor of the present invention was involved (See, *e.g.*, *In re Clay*, 966 F.2d 656, 23 USPQ 2d 1058 (Fed. Cir. 1992); *In re Paulsen*, 30 F.3d 1475, 31 USPQ 2d 1671 (Fed. Cir. 1994); and *Wang Labs., Inc. v. Toshiba Corp.*, 993 F.2d 858, 26 USPQ 2d 1767 (Fed. Cir. 1993).


In view of the above, Applicants respectfully submit that independent claims 1, 27, and 36, as amended, patentably distinguish over the cited references and are allowable. Claim 39 also patentably distinguishes over the prior art and is allowable. The remaining claims are at least allowable therewith as depending from an allowable base claim.

In addition to the amendment to independent claims 1, 27, and 36 discussed above, the remaining claims have been amended, where necessary to conform to amended claims 1, 27, and 36 and inconsistent claims have been canceled. The amendments to the claims are fully supported in the original disclosure. Thus, no new matter has been entered into the disclosure by way of these amendments.

Attached hereto is a marked-up version of the changes made to the application by the current amendment. The attached page is captioned **“Version with Markings to Show Changes Made.”**

In view of the above, it is respectfully submitted that this application is in condition for allowance. Accordingly, it is respectfully requested that this application be allowed and a Notice of Allowance issued. If the Examiner believes that a telephone conference with Applicant's attorneys would be advantageous to the disposition of this case, the Examiner is requested to telephone the undersigned.

Respectfully submitted,


Thomas Spinelli
Registration No. 39,533

Scully, Scott, Murphy & Presser
400 Garden City Plaza
Garden City, New York 11530
(516) 742-4343

TS/cm

Enclosure (Version with Markings to Show Changes Made)

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Claims 2, 3, and 28 have been canceled and the claims have been amended as follows:

1. (Twice Amended) A payload isolation system for isolating a payload from a base structure upon which the payload is supported, the payload isolation system comprising:

motion constraint means for maintaining a parallel relationship between the payload and the base structure throughout a range of motion, the motion constraint means comprising at least two parallelogram linkages, each of the at least two parallelogram linkages comprises first and second parallelogram sub-linkages, one of the first or second parallelogram sub-linkages being fixed to the payload or a portion thereof, the other of the first or second parallelogram sub-linkages being fixed to the base structure or a portion thereof; and

support means being deformable along the range of motion for providing transmission of vertical and/or lateral vibration between the payload and the base structure are suppressed.

4. (Amended) The payload isolation system of claim [3] 1, wherein [each of the at least one parallelogram linkage comprises first and second parallelogram sub-linkages,] the first and second parallelogram sub-linkages [sharing] share a common member[, one of the first or second parallelogram sub-linkages being fixed to the payload or a portion thereof, the other of the first or second parallelogram sub-linkages being fixed to the base structure or a portion thereof].

5. (Twice Amended) The payload isolation system of claim 4, wherein [the at least one parallelogram linkage comprises two or more parallelogram linkages wherein] at least two of the at least two [or more] parallelogram linkages are configured non-parallel to each other.

8. (Amended) The payload isolation system of claim [2] 1, wherein the [mechanical linkage] motion constraint means further comprises at least one scissor linkage each having first and second scissor sub-linkages disposed between the payload and base structure, the first and second scissor sub-linkages being connected to each other by first and second common members, a first end of each of the first and second scissor sub-linkages being fixed to the payload or a portion thereof and a second end of the first and second scissor sub-linkages being fixed to the base structure or a portion thereof.

23. (Twice Amended) The payload isolation system of claim 20, wherein the support adjustment means comprises:

a deformable mat having at least one internal tubular cavity; and

a ramp means for engaging the deformable mat to vary an amount of surface area of the deformable mat in operative contact with the payload; and

drive means for driving the ramp means between locations to [varies] vary the [an] amount of surface area of the deformable mat in operative contact with the payload;

wherein the feedback means controls the drive means to change the amount of surface area of the deformable mat in operative contact with the payload.

27. (Twice Amended) A motion constraint mechanism comprising:
a first [mechanical] parallelogram linkage disposed between a payload and a base structure; and

at least a second [mechanical] parallelogram linkage arranged relative to the first [mechanical] parallelogram linkage such that the first and at least second [mechanical] parallelogram linkages maintain a parallel relationship between the payload and the base structure throughout a range of motion[.];

wherein each of the first and at least second parallelogram linkages comprise first and second parallelogram sub-linkages, one of the first or second parallelogram sub-linkages being fixed to the payload or a portion thereof, the other of the first or second parallelogram sub-linkages being fixed to the base structure or a portion thereof.

29. (Amended) The motion constraint mechanism of claim [28] 27, wherein [each of the parallelogram linkages comprises first and second parallelogram sub-linkages,] the first and second parallelogram sub-linkages [sharing] share a common member[, one of the first or second parallelogram sub-linkages being fixed to the payload or a portion thereof, the other of the first or second parallelogram sub-linkages being fixed to the base structure or a portion thereof].

30. (Amended) The motion constraint mechanism of claim 27, wherein the first and at least second [mechanical] parallelogram linkages are arranged non-parallel to each other.

31. (Amended) The motion constraint mechanism of claim 27, [wherein at least one of the first or at least second mechanical linkages comprises] further comprising a

scissor linkage having first and second scissor sub-linkages disposed between the payload and base structure, the first and second scissor sub-linkages being connected to each other by first and second common members, a first end of each of the first and second scissor sub-linkages being fixed to the payload or a portion thereof and a second end of the first and second scissor sub-linkages being fixed to the base structure or a portion thereof.

36. (Three Time Amended) A method of constraining motion between a payload and a base structure, the method comprising the steps of:

providing a first [mechanical] parallelogram linkage disposed between the payload and the base structure;

providing at least a second [mechanical] parallelogram linkage disposed between the payload and the base structure; [and]

fixing a first parallelogram sub-linkage from each of the first and at least second parallelogram linkages to the payload or a portion thereof and fixing a second parallelogram sub-linkage from each of the first and at least second parallelogram linkages to the base structure or a portion thereof; and

arranging the first and at least second [mechanical] parallelogram linkages relative to each other such that the first and at least second [mechanical] parallelogram linkages maintain a parallel relationship between the payload and the base structure throughout a range of motion.

37. (Amended) The method of claim 36, wherein the arranging step comprises configuring the first and at least second [mechanical] parallelogram linkages non-parallel to each other.